



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q80838

Koji SHIRAKAWA, et al.

Appln. No.: 10/812,074

Group Art Unit: 1752

Confirmation No.: 3020

Examiner: Sin J. Lee

Filed: March 30, 2004

For: POSITIVE RESIST COMPOSITION

SUPPLEMENTAL DECLARATION UNDER 37 C.F.R. § 1.132

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Koji Shirakawa, hereby declare and state:

I am a citizen of Japan.

I graduated from Shizuoka University, the Department of Engineering, Course of Applied Chemistry in March 1991.

I have been employed by Fuji Photo Film Co., Ltd. (now FUJIFILM Corporation) since April 1991 and have been engaged in research and development of photoresist formulations for semiconductors at Fuji's Yoshida-Minami Factory Research Division.

I am a co-inventor of the invention described and claimed in the above-named application, and I am familiar with the subject matter disclosed by the application as well as the Office Action dated August 23, 2006 concerning the application.

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The purpose of this Supplemental Declaration is to explain in more detail why the superior results obtained with the positive resist composition of our invention are significant. In my previous Declaration signed May 26, 2006, I provided data showing that the resist composition of our invention provides superior results in comparison to Nishiyama et al '718 with respect to sensitivity, resolution, pattern profile, and in vacuo PEB properties. I understand that the Examiner has invited the submission of a Supplemental Declaration showing or explaining why these differences in results are of statistical or practical significance.

Improvements in each of sensitivity, resolution, pattern profile and in vacuo PEB properties are recognized and understood by persons skilled in the photoresist art as being of practical significance. I consider the superior resolution and pattern profile results obtained with our positive photoresist, relative to Nishiyama et al. to be of particular practical significance, as discussed below:

Resolution

Based on the road map of International Technology Roadmap for Semiconductors (ITRS), it is confirmed that a minimum line width of half pitch indicating device evolution is improved in resolution by approximately 0.02 μm as every generation changes. The improved results achieved by the present invention show improvement in resolution of 0.04 μm . See Table B at page 3 of my previous Declaration. Thus, the results indicate an effect for nearly preparing a device in the second future generation at once. This is a fairly significant difference in the resist composition field to which the present invention belongs.

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Pattern Profile

As a problem when an electron beam is used, deterioration in device performance due to a tapered profile shape, which is caused by forward scattering when an electron beam enters a resist film, is pointed out. Profile is an important factor affecting etching after the preparation of a resist pattern. Thus, making a rectangular profile is a significant effect. Here, as shown in my prior Declaration, the resist of our invention provides a rectangular profile, whereas the resist of Nishiyama et al provided a slightly tapered profile.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that those statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: Nov. 17, 2006

Koji Shirakawa
Koji Shirakawa